

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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For: ANTENNA WITH POWER MATCHING CIRCUIT

Serial No.: 10/711,908 Examiner: Tho Gia Phan

Filed: October 12, 2004 Group Art Unit: 2821

Atty. Docket: 71368-0075

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Commissioner for Patents
PO Box 1450
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Sir:

RESPONSE TO OFFICE ACTION

This paper is responsive to the Office Action mailed December 12, 2005. Applicant requests further consideration and examination in view of the following amendments and remarks:

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 4 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A mobile antenna comprising a center-fed, broadband, dipole radiator, and a coupler assembly for mounting the dipole radiator to a mount, wherein a power matching circuit is connected between the dipole radiator and the coupler assembly to maintain an effective balance of current distribution and impedance in conductive elements of the antenna.
2. (Original) The mobile antenna of claim 1 wherein the power matching circuit comprises a capacitor.
3. (Original) The mobile antenna of claim 1 wherein the power matching circuit comprises a resistor and a capacitor connected in series.
4. (Original) The mobile antenna of claim 1 wherein the power matching circuit comprises a resistor and a capacitor connected in parallel.
5. (Original) The mobile antenna of claim 1 comprising two power matching circuits on opposite sides of the coupler assembly and dipole radiator.
6. (Original) The mobile antenna of claim 1 further comprising a heat sink in the coupler assembly.
7. (Original) The mobile antenna of claim 6 wherein the heat sink is a conductive coupler nut extending from the coupler assembly that surrounds and supports the dipole radiator.

8. (Original) The mobile antenna of claim 7 wherein the dipole radiator is enclosed in a dielectric housing.

9. (New) An antenna adapted to be removably mounted to a vehicle, the antenna comprising a center-fed, broadband, dipole radiator in a whip, and a coupler assembly for mounting the whip to a mount on a vehicle, wherein a power matching circuit is connected between the whip and the coupler assembly to maintain an effective balance of current distribution and impedance in conductive elements of the antenna.

10. (New) The mobile antenna of claim 9 wherein the power matching circuit comprises a capacitor.

11. (New) The mobile antenna of claim 10 wherein the power matching circuit comprises a resistor connected to the capacitor in series.

12. (New) The mobile antenna of claim 10 wherein the power matching circuit comprises a resistor connected to the capacitor in parallel.

13. (New) The mobile antenna of claim 9 comprising two power matching circuits on opposite sides of the coupler assembly.

14. (New) The mobile antenna of claim 9 further comprising a heat sink in the coupler assembly.

15. (New) The mobile antenna of claim 2 wherein the power matching circuit comprises a resistor connected to the capacitor in series.

16. (New) The mobile antenna of claim 2 wherein the power matching circuit comprises a resistor connected to the capacitor in parallel.

Remarks

Claims 1-8 were in the application as last examined. By the present amendment, new claims 9-16 are added. No new matter is added by the present amendments. Applicants respectfully request further examination and consideration in light of the foregoing amendments and the following remarks.

Rejections under 35 U.S.C. § 112

Claims 7 and 8 stand rejected under 35 U.S.C. §112 as being indefinite. The rejections are respectfully traversed.

According to the Examiner, the phrase “the heat sink” lacks a proper antecedent basis. Applicants respectfully point out that claims 7 and 8 depend from claim 6, which calls for a heat sink on the coupler assembly. Claim 6 provides antecedent basis for the recitation in claims 7 and 8. Respectfully, the rejections are erroneous and should be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 1-5 stand rejected under 35 U.S.C. §103 (a) as being unpatentable over the U.S. Patent No. 6,249,261 to Solberg et al. in view of U.S. Patent No. 4,789,869 to Aslan. The rejections are respectfully traversed.

“Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed Cir. 1992).” M.P.E.P. § 2143.01. The showing of combinability, in whatever form, must be “clear and particular.” *In re Dembicza*k, 175 F.3d 994, 50 USPQ 2d 1614 (Fed. Cir. 1999)

There is no motivation or suggestion in the references for making the alleged combination, and therefore it would not have been obvious to make the combination.

The Solberg et al. '261 patent relates to making direction finding antennas invisible to radar. It does so by constructing a multiple dipole antenna from conductive polymer composites. The Aslan '869 patent relates to maintaining a flat frequency response when monitoring electromagnetic radiation fields over an extended frequency range in a dipole antenna. It does so by separating each pole into two segments with a high resistance between the two segments in one pole and a low resistance between the two segments in the other pole. There is nothing in either reference to lead one ordinarily skilled in the art to the other and there is no motivation for combining the references. Neither reference has anything to do with balancing current distribution or improving gain (the suggested reasons asserted by the Examiner).

More importantly, however, even if the alleged combination were proper or even tenable, it would still not reach the invention of claims 1-5. The circuit in Aslan identified by the Examiner as a power matching circuit is nothing of the sort. It is, rather, a conventional diode detector represented by a diode, a capacitor and a resistor in parallel between the two poles of the dipole antenna (see Col. 3, ll. 1-4). Nothing in the Solberg et al. '261 patent or in the Aslan '869 patent teaches or suggests either a mobile antenna, a power matching circuit, or placing a power matching circuit in the coupling assembly of a mobile antenna. Therefore, the claims are patentable over the alleged combination.

The Examiner suggests that that it would have been obvious to use a plurality of power matching circuits without citing any reference therefore. Even if the Aslan '869 patent suggested a power matching circuit (which it does not), nothing in either reference would lead one ordinarily skilled in the art to placing two power matching circuits on either side of the coupler assembly. The Examiner relies upon no other reference for this assertion, so Applicants are left to guess the basis for the Examiner's conclusion. For all of these reasons, the rejection is untenable and should be withdrawn.

Claim 6 stands rejected under 35 U.S.C. §103 (a) as being unpatentable over the Solberg et al. '261 as modified by the Aslan '869 patent and further in view of U.S. Patent No. 5,280,412 to Podell et al. The rejections are respectfully traversed.

The forgoing comments regarding the alleged combination of Solberg et al. '261 and Aslan '869 apply equally here. As well, there is nothing to teach, or suggest combining the Podell et al. '412 patent with either Solberg et al. '261 or Aslan '869. The

Podell et al. '412 patent acknowledges that using heat sinks to draw heat from a circuit component are known. (Col. 1, ll. 17-18). Nothing in the disclosure of the Podell et al. '412 patent adds anything beyond this simple concept that is remotely relevant to the present invention. Nothing in either Solberg et al. '261 or Aslan '869 suggests anything about a heat problem that might require a heat sink. Heat is only a problem when antennas are operated at higher powers. (See para. 6 of the application). Nothing is mentioned about high power operation in either the Solberg et al. '261 or Aslan '869 patents. The alleged combination appears to be little more than a hindsight reconstruction of the concept of a heat sink in a circuit for a microwave antenna combined with a stealth direction finding antenna and a dipole antenna with a diode detector.

Even if the alleged combination were proper or even tenable, it would still not reach the invention of claim 6. The circuit in Aslan is not a power matching circuit as required by claim 1 from which claim 6 depends. Moreover, nothing in any of the references teaches or suggests the location of a heat sink, i.e., in the coupler assembly. For all of these reasons, the rejection is untenable and should be withdrawn.

New claims

New claims 9-16 are added to more fully claim Applicants' invention. Claims 15 and 16 depend from claim 2 and are patentable for the same reasons that claim 2 is patentable. Claim 9 is a new independent claim having limitations similar to claim 1 that are believed patentable over the art of record. It is patentable for the same reasons that claim 1 is patentable. And claims 10-14 depend from claim 9 so that they are likewise patentable as depending from the patentable claim 9.

Conclusion

In the absence of any other cited art, it is believed that all of the claims are now allowable and early notice of Allowability is respectfully requested. Any questions concerning the foregoing may be directed to the undersigned at 616-742-3513 or jeb@mcgarrybair.com.

Respectfully submitted,

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Dated: March 8, 2006

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